

## 4.0 INVESTIGATION RESULTS

### 4.1 COMPREHENSIVE SURVEY

Debris pile delineation and electrical debris locations for the three piles as identified during this and previous in-water surveys are depicted in Figure 3.

The debris piles are described below in order of location from east to west. Volume estimates were made of total debris and electrical debris. Electrical debris includes lightening arrestors, interteer capacitors, light ballasts, switches, post insulators and other miscellaneous electrical equipment.

**Pile #1** - The dimensions of the debris pile are approximately 75 by 63 feet. This was calculated by plotting the individual items observed during the survey and drawing a line around the extent of the items. The diver reported the debris to be about one foot deep in most locations and two feet deep in isolated pockets. The volume of the debris pile was estimated using a depth of one foot (using a depth of two feet would grossly overestimate the volume) and resulted in an estimated debris volume of 4,725 cubic feet. The percentage of debris estimated to be electrical debris is 70%, resulting in a conservative electrical debris volume estimate of 3,308 cubic feet (123 cubic yards).

Debris was also observed along the shoreline of the island in this area. The debris consisted of wire cable; no electrical debris was noted along the shore. The presence of the debris corresponds to the information gathered from interviews of past USACE employees which indicated that switchgear and various cables were dumped in this vicinity (Tetra Tech, 1998).

**Area between Pile #1 and Pile #2** - This area was observed to contain very little debris: cable or wire, a piece of culvert, cyclone fencing, and an electrical control panel were observed. The volume of electrical debris is conservatively estimated to be approximately 10 cubic feet. This debris in this area was determined to be an extension of Pile #2, rather than a detached, separate pile.

**Pile #2** - The dimensions of the debris pile are approximately 88 by 38 feet. The diver reported the debris to be about one foot deep on the west end of the pile, and 2-3 feet deep near the eastern end of the pile. The volume of debris in Pile #2 is estimated conservatively to be 6,688 cubic feet based on a thickness of two feet. The debris was estimated to be 50% electrical, resulting in a conservative electrical debris volume estimate of 3,344 cubic feet (124 cubic yards).

**Pile #3** - This pile was discovered during the May 2001 downstream survey; the area had not previously been surveyed. The dimensions of the debris pile are approximately 40 by 30 feet and 1-2 feet deep. The debris consists almost entirely of lightning arrestors. The volume of electrical debris in this pile is conservatively estimated to be 1,800 cubic feet (66 cubic yards). This pile is depicted in Figure 3.

Approximately 8,462 cubic feet (313 cubic yards) of electrical debris has been identified (all debris piles) in the Columbia River near the Bradford Island shoreline proximate to the landfill.

#### 4.1.1 Discussion of Survey Results

Electrical equipment found near the shore of Bradford Island is the primary source of PCBs. The concentration of PCBs varies with the type of equipment. Equipment may contain PCBs as dielectric fluid in a liquid or solid phase. Four types of equipment previously recovered from the river have been shown to contain PCBs (see table below). Inerteen was a dielectric (insulating) fluid used by Westinghouse Electric Corporation in capacitors. As originally formulated, Inerteen contained a mixture of between 60 – 75% PCBs and 25 – 40% trichlorobenzenes, depending on the specific mixture.

Equipment Type	Concentration of PCBs	Solid or Liquid
Inerteen Capacitor	20 percent	Liquid
Coupling Capacitor	1.99 mg/kg	Liquid
Lighting Ballast	258 mg/kg	Solid
Lightening Arrestor (felt)	6.35 mg/kg	Solid

One of the capacitors retrieved during the December 2000 (partial) equipment removal generated a oily sheen when placed into a containment drum for storage. To the extent this item is representative of other items still in the river, PCBs from other electrical equipment may also be being released. There remains some uncertainty with respect to the contents of the debris piles. The noted contents are restricted to those at the surface of the piles visible to the diver.

## 4.2 WATER COLUMN AND COLLOCATED SEDIMENT RESULTS

Laboratory analytical results for water column samples are summarized in Table 4-1 and include the sediment, particulate and dissolved phase (water) concentrations. The water column samples were filter at the laboratory through a 0.7-micron glass filter to separate the phases.

At the request of the Oregon Department of Environmental Quality (DEQ), sediment PCB concentrations were compared to the National Oceanic and Atmospheric Administration Freshwater Sediment Ecological Threshold Effects Level (NOAA TEL) (Buchman, 1999) and to the background sample result collected upstream at Goose Island. Water PCB concentrations were evaluated against the Ambient Water Quality Criteria (AWQC) (USEPA, 1999). A summary and description of these benchmark-screening values is presented in Table 4-18.

#### 4.2.1 Sediment

Aroclor 1254 was detected in the sediment samples collected at the same locations as the water column samples at Piles #1 and #2 and exceeded the NOAA TEL (0.0341 mg/kg) in each case. Aroclor 1254 was detected in the background sample at a concentration of 0.0178 mg/kg. The background sample did not exceed the NOAA TEL.

#### 4.2.2 Particulate

Particulate analytical results were reported in terms of the mass ( $\mu\text{g}$ ) of PCBs in the volume of water that was filtered (liter) to collect particulates for analysis. Pile sample results ranged from 7.28  $\mu\text{g/L}$  to 0.132  $\mu\text{g/L}$  in Pile #1 and was reported to be 0.243  $\mu\text{g/L}$  in Pile #2. PCB concentrations were higher in the water column within Pile #1 than Pile #2 for both dissolved and particulate phase (Aroclor 1254 only). Aroclor 1254 was detected in both Piles #1 and #2 water column particulate samples and exceeded the AWQC (0.014  $\mu\text{g/L}$ ). PCBs were not detected at the background location in the particulate phase, due possibly to the lower sediment concentrations when compared to the concentrations of PCBs within the piles.

#### 4.2.3 Dissolved

Aroclor 1254 was found both Piles #1 and #2 water column dissolved samples and exceeded the AWQC. A field duplicate result within Pile #1 exhibited a dissolved PCB concentration of 0.0399  $\mu\text{g/L}$ , a concentration also above the AWQC. However, PCBs were not detected in the primary sample, associated with this field duplicate. PCBs were not detected at the background location in the dissolved phase. Pile sample results ranged from 0.265  $\mu\text{g/L}$  to 0.0174  $\mu\text{g/L}$  in Pile #1 and were reported to be 0.0199  $\mu\text{g/L}$  in Pile #2.

#### 4.2.4 Discussion of Water Column Results

The water column sample technique was designed to mimic the affects of the proposed equipment removal on water quality. Samples of both the water and the particulate was collected and analyzed, yielding data of the PCB content of both the suspended solids (particulate) and dissolved fraction of the water column sample. PCBs were present in the water column in both the particulate and dissolved phases. Concentrations of PCBs in the water column tended to correspond in magnitude to concentrations of PCBs in the sediment. Therefore, it is concluded that a localized increase in turbidity would result in a localized increase in partitioning of PCB from the particulate (resuspended sediment) component to the river water (dissolved component).

The USEPA Ambient Water Quality Criteria for PCBs (total PCBs) in freshwater are 2.0  $\mu\text{g/L}$  for Criterion Maximum Exposure (CMC) and 0.014  $\mu\text{g/L}$  for the Criterion Continuous Exposure (CCC) for the protection of aquatic biota. The CMC represents a conservative acceptable concentration in water for acute exposures (typically derived from 48-hour and 96-hour toxicity tests) and the CCC is protective of chronic exposures (typically derived from tests longer than 96

hours). For PCBs, the CCC value also takes into account the potential for bioaccumulation. These criteria are based on a default assumption of 5 mg/L dissolved organic carbon (DOC) or less. These criteria have been adopted by Oregon as their PCB water quality standards for protection of aquatic life.

The likely average concentrations of PCBs in water exceed the CCC values but are lower than the CMC value. If DOC in the water column exceeds 5 mg/L, the application of the AWQC would increase in conservatism, due to reduced bioavailability of PCB in the water column. The AWQC also have uncertainty factors built into their development to provide for additional margins of safety and therefore represent theoretical "no effects" levels. Exceedance of the AWQC therefore does not mean that adverse effects are probable or likely, only that the intentionally conservative threshold level has been exceeded.

Due to the fact that a dissolved sample was not collected under ambient conditions, it can not be definitively determined that the presence of PCBs in the dissolved sample is a result of the sediment disturbance (i.e. PCBs may be present during ambient conditions). However, SPMD concentrations indicate that Aroclor 1254 is not present in the water column at the debris piles or at the background location at ambient conditions.

### 4.3 SEDIMENT RESULTS

All nine sediment samples were analyzed for PCBs and TOC. Five of the samples were also analyzed for pesticides, SVOCs, herbicides, metals and hydrocarbons. Three samples were analyzed for grain-size distribution (one from Pile #1 and two from Pile #2). Laboratory analytical results for sediment samples are summarized in Tables 4-2 through 4-7. At the request of DEQ, sediment results were compared to the following conservative ecological screening values in order of priority:

- NOAA TEL (Buchman, 1999)
- Threshold Effect Concentrations (TEC) (MacDonald *et al*, 2000).

In the event a NOAA TEL or TEC value was not available for a particular compound, the lowest of the following screening values was selected for comparison to sediment results:

- Canadian Sediment Quality Guidelines for the Protection of Aquatic Life-Interim Freshwater Sediment Quality Guidelines (ISQGs) (Canadian Council of Ministers of the Environment, 1999)
- Ontario Ministry of the Environment Lowest Effect Level [Ontario LEL] (Ontario Ministry of the Environment, 1993)
- Assessment and Remediation of Contaminated Sediment Project Threshold Effect Concentration [ARCS] (USEPA, 1996)
- Oak Ridge National Laboratory Secondary Chronic Values [ORNL] (Jones, 1997)
- Office of Solid Waste and Emergency Response [OSWER] (USEPA, 1996)

- Environmental Protection Agency Region 9 [Region 9] (1995)
- Washington State Sediment Quality Criteria “No Effects” level (Washington State Department of Ecology, 1998)
- New York State Sediment Lowest Effect Level for Metals [New York LEL] (New York State Department of Environmental Conservation, 1999)

The screening values used in the evaluation of each compound are provided in the Analytical Results Tables. A summary and description of all benchmark-screening values is presented in Table 4-18. Compounds for which no screening values were available are presented in Table 4-19. Method reporting limits for six compounds were above benchmark values. However, it is possible to confirm the absence of the contaminants above the benchmark values because the detection limits were below the benchmark values. Further discussion of the method reporting limits is available in the quality assurance/quality control (QA/QC) review (Appendix C).

#### 4.3.1 PCBs

Aroclor 1254 was detected in sediments within and on the perimeter of Piles #1 and #2; concentrations exceeded the NOAA TEL. PCBs were not detected at the perimeter sample collected from Pile #1. The results for sediment samples collected within Pile #2 are discussed in Section 4.2, Water Column Results. For both piles, PCB concentrations are highest in the interior and are much lower at the perimeter locations. For Pile #1, PCBs were not detected in the perimeter locations and for Pile #2, concentrations at the perimeter ranged from one-third to one-fifth of the interior concentrations. The PCB sample results are shown in Figure 6, as well as the tables noted above.

#### 4.3.2 Pesticides

The pesticides 4,4'-DDD, 4,4'-DDT and 4,4'-DDE were detected in the sediments on the perimeter of Pile #2, but did not exceed any of the benchmark screening values. No other pesticides were detected. Although the reporting limits for some of the pesticides exceeded the screening values, the RLs represent the limits of practically attainable analytical testing technology. However, the uniform absence of pesticide detections in all the samples suggests that there is little reason to believe these compounds are significant sediment contaminants. Therefore, the exceedance of SBVs by some of the pesticide RLs is unlikely to be a significant data gap or data deficiency.

#### 4.3.3 TOCs

TOC results in sediments for all debris piles were below 5,000 mg/kg (0.5%). The grain size distribution for sediment samples indicates that pile samples are composed almost entirely of gravel and sand with 2.5 % or less of silt and clay. The grain size, in combination with the low organic carbon content, indicates that the areas of the piles are not conducive to partitioning of PCB compounds into the solid (sediment) phase. The presence of PCBs in sediment may

represent an uncertainty with the TOC results or may indicate that another organic phase (i.e. oil) exists within the sediment.

#### **4.3.4 SVOCs**

SVOCs were detected in all of the debris piles. Several polycyclic aromatic hydrocarbons (PAHs) were detected above the NOAA TEL on the perimeter of Pile #2 including benzo(a)anthracene (59 µg/kg), benzo(a)pyrene (78 µg/kg), benzo(b)fluoranthene (87 µg/kg), chrysene (58 µg/kg), fluoranthene (98 µg/kg), indeno(1,2,3-cd)pyrene (29 µg/kg), phenol (35 µg/kg), pyrene (100 µg/kg). Benzidine was detected on the perimeter and within Pile #2 at concentrations exceeding the ORNL (1.7 µg/kg), the lowest of the freshwater sediment ecological benchmark screening values.

#### **4.3.5 Herbicides**

Herbicides were not detected in the sediment samples at the reported detection limits.

#### **4.3.6 Metals**

Cadmium, copper, lead and iron were detected above benchmark values (NOAA TEL, NOAA TEL, New York LEL and Ontario LEL, respectively) in the debris piles, however cadmium concentrations were similar to background concentrations (Lower Columbia River Bi-State Program, 1993). In addition, nickel was detected above the NOAA TEL benchmark on the perimeter of Pile #1 and manganese was detected above the Ontario and New York LEL benchmarks. For all the metals, the exceedances were relatively low, and less than two times the benchmark screening value.

#### **4.3.7 Hydrocarbons**

Hydrocarbons were not detected in the sediment samples at the reported detection limits.

#### **4.3.8 Grain Size**

Pile #1 contained a well-graded gravel-sand mixture with little or no fines (Unified Soil Classification System [USCS] classification GW). Pile #2 contained well-graded gravelly sands with little or no fines (USCS classification SW) (ASTM, 1993). These samples represent the pockets of sediment that exist in between the debris and larger (cobble size) grains. There may be some uncertainty with the results since the sampling method utilized (a diver placing sediment into a jar underwater) could result in an unknown loss of fines.

#### **4.3.9 Discussion of Sediment Results**

The source of the PCBs within the sediment appears to be the electrical equipment. The PCB Aroclor found in the offshore area of Bradford Island matches the Aroclor type (1254) detected in the inerteen capacitor, coupling capacitor, lightning ballast and the felt on the end of a fuse



extracted from the area and sampled for disposal. A different Aroclor, Aroclor 1260, was detected in the soil in the landfill (Tetra Tech, 1998) indicating that the source of PCB contamination in the water may not be the result of soil erosion or groundwater transport from Bradford Island. Aroclor 1260 was also detected in the drain and outfall samples near the Sandblast Building, and may be directly related to the PCB oil released from a transformer in 1995 (USACE, 1995).

While the equipment is the primary source of PCBs, the contaminated sediment represents a secondary source of PCBs. PCBs were detected in the sediment up to a concentration of 23.9 mg/kg. The PCB concentrations near existing or removed equipment are generally higher than sediment concentrations further away from the equipment, suggesting a concentration gradient decreasing away from the equipment. The offshore area is a high-energy environment or scour area based on the demonstrated high river velocities, which is evidenced by the general lack of fine-grained sediment that exists, and the fact that the relatively coarse-grained sediments at the site contain elevated PCB concentrations.

The elevated PCB concentrations in sediment at the site are unusual because the grain size of the sediment is coarse and the total organic carbon concentrations are low. Typically, PCBs released in aquatic environments are generally expected to sorb to organic carbon found in fine-grained sediments. Therefore, PCBs are generally found where fine-grained (carbon-rich) sediments exist. The elevated PCB concentrations at the site may be explained by the presence of trace amounts of the dielectric as liquid or solid phase in the sediments.

## 4.4 SPMD RESULTS

Analytical results are presented in Table 4-9. SPMDs were reported as non-detect for PCB Aroclors.

The SPMD method-reporting limit for PCB Aroclor 1254 was reported by the laboratory in units of ng/SPMD. The reporting limit for Aroclor 1254 in the water was calculated using the method described in Section 3.4.3. As discussed in Section 3.4.3, calculated reporting limits should be considered estimates. When the more conservative linear uptake model is applied, the non-detect Aroclor 1254 concentration is 0.2 ng/L. The level at which the Aroclor was not detected is below the AWQC of 14 ng/L.

### 4.4.1 Discussion of SPMD Results

The presence of PCBs in water can have biological consequences at concentrations below which it is possible to detect the contaminants in samples obtained using conventional sampling techniques. SPMDs can reveal occurrence of contamination at these environmentally-relevant levels (USGS, 1999). SPMD results indicate that PCB-Aroclors are not present at these low levels during steady-state conditions. While the water column results (dissolved and particulate) indicate that localized partitioning of PCBs to the water column may occur when sediments are mechanically suspended, the PCBs did not appear to partition to the water column during steady-state conditions.

## 4.5 BIOLOGICAL TISSUE RESULTS

Clam and crayfish tissue was analyzed for PCBs and lipid content. PCBs were detected in clam tissue and crayfish tissue and exoskeleton collected at the debris piles and at the background location.

Analytical results are presented in Table 4-10. Aroclor 1254 was detected in all clam tissue samples collected at the debris piles at concentrations ranging from 604  $\mu\text{g/kg}$  to 344  $\mu\text{g/kg}$ . Clam tissue collected at the background location exhibited an Aroclor 1254 concentration of 23.8  $\mu\text{g/kg}$ . In general, the debris pile clam tissue concentrations of Aroclor 1254 were ten times the concentration found in the clam tissue collected at the background location.

Crayfish sample results collected at the debris piles exhibited Aroclor 1254 concentrations ranging from 2,670  $\mu\text{g/kg}$  to 75,600  $\mu\text{g/kg}$ . Crayfish collected at the background location exhibited an Aroclor 1254 concentration of 268  $\mu\text{g/kg}$ . PCBs detected in crayfish may be the result of bioaccumulation or may be due to presence of PCBs (in dielectric fluid) on the crayfish skeleton, or a combination of both. If crayfish concentrations are a result of bioaccumulation, crayfish sample results may not be directly comparable due to the differences in the sizes of individuals between the sample locations. PCB concentrations will tend to be higher in larger, older crayfish due to the longer period of time the individuals are exposed. Crayfish weight and sizes are presented in Table 3-2.

The relatively high concentrations of Aroclor 1254 in the tissues for sediment-associated biota at the piles, the detection of the same Aroclor in the sediment, and the lack of Aroclor 1254 in the water column at steady state conditions (as sampled with the SPMDs), indicates that the sediment in the piles may be an exposure medium for ecological receptors. Similarly, these data suggest that the river water may not be a significant source of PCBs observed in the species studied.

### 4.5.1 Discussion of Tissue Results

There are no readily available screening benchmark values for PCBs in shellfish tissues. However, there are a variety of screening values for PCBs in fish tissues that have been developed for the protection of aquatic biota and humans who may consume fish. These benchmark values range from 10  $\mu\text{g/kg}$  to 23  $\mu\text{g/kg}$  (whole fish, wet wt) for the protection of human health and 100  $\mu\text{g/kg}$  for the protection of piscivorous wildlife (USEPA 1995, OEHHA 1998, GLWQI 1989). In the absence of shellfish-specific tissue screening values, the fish tissue screening values (for protection of aquatic biota and for human health) were compared against the reported clam and crayfish tissue concentrations. The screening values were exceeded for both clams and crayfish, at all locations including the background locations. However, the magnitude of exceedance was greater at the debris piles.

The exceedance of screening benchmark values (for water, sediment and tissues) does not necessarily indicate that there is actually a risk to ecological or human receptors who may be exposed to these media. The benchmark values are generic, non-site-specific, intentionally



conservative values that are meant to be used for screening purposes only. As such, detected chemicals that do not exceed their benchmark values may be eliminated from further risk considerations. Chemicals that exceed their benchmark values may be evaluated further, on a more site-specific and receptor-specific basis to assess whether they are present at concentrations that are likely to pose a threat to aquatic biota and associated wildlife and human receptors. This additional evaluation may be performed in accordance with DEQ's Guidance for Ecological Risk Assessment. Alternatively, since the exceedances of chemicals appear to be localized the option of removal of the localized elevated concentrations without further assessment may also be considered.

## 4.6 STORMWATER DRAIN SEDIMENT RESULTS

The stormwater catch basin and outfall sediment samples were analyzed for PCBs, TOC, SVOCs, metals, hydrocarbons and butyltins. In addition, the catch basin samples were analyzed for VOCs and the outfall samples were analyzed for butyltins in porewater. Analytical results are presented in tables 4-11 through 4-15. At the request of DEQ, sediment results were again compared to the NOAA TEL and TEC. In the event a NOAA TEL or TEC was not available for a particular compound, the lowest of the screening values provided in Section 4.3 was chosen for comparison to sediment results. The tributyltin results were compared to the Puget Sound Tributyltin No Adverse Effect Level (Puget Sound NEL). The screening values used in the evaluation of each compound are provided on the Analytical Results Tables. A summary and description of all benchmark values is presented in Table 4-18. Compounds for which no screening values were available are presented in Table 4-19.

### 4.6.1 PCBs

Aroclor 1260 was detected in all catch basin and outfall samples. The Aroclor 1260 concentration exceeded the NOAA TEL benchmark in catch basin #1 and drain outfall #1 (Figure 4).

### 4.6.2 TOCs

TOC concentrations were between 4,100 and 20,000 mg/kg (0.41 – 2%).

### 4.6.3 SVOCs

SVOCs were detected in all of the catch basin and outfall samples. Several PAHs were detected above the NOAA TEL in all of the samples. In addition, bis(2-ethylhexyl)phthalate concentrations in catch basin #1 and #2 and outfall sample #1 exceeded the Region 9 benchmark value.

### 4.6.4 VOCs

Acetone and carbon disulfide concentrations in both catch basin #1 and #2 exceeded the ORNL.

#### **4.6.5 Metals**

Arsenic, cadmium, chromium, copper, nickel and zinc concentrations exceeded NOAA TEL benchmark values in all samples. In addition, iron and manganese were detected above the NY and Ontario LEL benchmark values in all sample locations. Arsenic, cadmium, iron, manganese and some nickel concentrations were similar to background soil concentrations (Washington State Department of Ecology, 1994).

#### **4.6.6 Hydrocarbons**

Hydrocarbons in the diesel and motor oil range were detected in all catch basin and outfall samples. No ecological sediment screening benchmark value was available for hydrocarbons in the diesel or motor oil range.

#### **4.6.7 Butyltins**

Butyltins were detected in catch basin #1, drain outfall #1 and drain outfall #2 sediment samples. The catch basin #2 tributyltin (TBT) concentration exceeded the Puget Sound NEL saltwater benchmark value. Porewater analysis for butyltins exhibited detections for mono- and dibutyltin, however, no benchmark screening values were available for comparison. TBT was not detected in the porewater analyses.

#### **4.6.8 Discussion of Sediment Results**

Contaminants found in the catch basins near the Sandblast Building appear to have impacted the sediment collected directly below the catch basin outfalls in the Columbia River. The contamination consists of mostly the same PCB, PAH and metals compounds in the drain samples (Tables 4-11, 4-13 and 4-15). In addition, the PCB Aroclor found in the catch basins and the sediment below the outfalls in the sandblast grit area (Aroclor 1260) is the same Aroclor found in the transformer fluid spilled at this location in 1995. This differs from the sediments adjacent to the landfill, where Aroclor 1254 was detected.

TBT was detected above the selected benchmark value in the bulk sediment above catch basin #2. The bulk sediment TBT concentration collected below the catch basin #2 outfall was below the benchmark value. TBT was not detected in the pore water sampled below the outfall, indicating that the compound is not bio-available to potential aquatic ecological receptors.

The stormwater drains exhibit contamination that may be a result of maintenance activities conducted nearby and the sandblast building and the release of transformer oil.

### **4.7 WASTE CHARACTERIZATION**

To facilitate waste disposal, USACE sampled electrical equipment retrieved from the shoreline of Bradford Island in October 2000. Analytical results are summarized in Table 4-20. PCB

Aroclor 1254 was detected in four pieces of electrical equipment. The results of the USACE's electrical equipment testing are presented in Appendix F.

#### **4.8 DATA QUALITY EVALUATION**

Laboratory data was independently validated for quality and usability. The validation identified false positives (PAHs), unverifiable quantitation limits, and results that should be considered estimated. The Data Validation Report is presented in Appendix C.

Validated concentrations, quantitation limits and qualifiers are presented in the Analytical Data Summary tables (Tables 4-1 through 4-17). The data is acceptable for project use as reported with associated qualifiers.

#### **4.9 UNCERTAINTIES IN FIELD AND ANALYTICAL DATA**

The data evaluation process includes several sources of uncertainty. There are uncertainties associated with field sampling and collection and laboratory analyses that introduce some unavoidable and unquantifiable uncertainty into the data that may tend to underestimate or overestimate actual contaminant concentrations. Additionally, for some pesticide chemicals, the RLs exceeded the screening benchmark values. Because these were a limited number of chemicals and they were uniformly reported as non-detects, it is believed that their occurrence is unlikely and therefore, the uncertainty associated with the high RLs is believed to be of low significance for this site investigation.

There are also a number of chemicals for which no screening benchmarks were available (Table 4-19) including several inorganics (metals), SVOCs and herbicides. The majority of these chemicals were reported as non-detects. The few chemicals that were detected are primarily metals with a generally low or poorly known potential for ecological toxicity (selenium excluded). The primary source of these chemicals, if they were likely to occur, would be through overland runoff from the landfill via stormwater.

The type of Aroclor that was found in the in-water surveys (Aroclor 1254) is different from the Aroclor 1260 that was found at the landfill, indicating that solid phase transport from the landfill does not appear to be a significant source of PCBs (and by extension, other low solubility chemicals) to the river sediments. Because of the low potential for these chemicals without benchmarks to be actually present in the sediments, the uncertainty associated with these analytical data is believed to be of low significance.